IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	)	
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PETRUS JOHNANNES WALTERUS MARIA VAN DEN BOSCH ET AL	)	
	)	
Serial No. 10/561,690	)	Group Art: 1797
	)	
Filed: December 22, 2005	)	Examiner: Prem C. Singh
	)	
PROCESS TO PRODUCE PIPELINE-TRANSPORTABLE CRUDE OIL FROM FEED STOCKS CONTAINING HEAVY HYDROCARBONS	)	October 21, 2008

COMMISSIONER FOR PATENTS
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPPEAL BRIEF

REAL PARTY IN INTEREST

The real party in interest is Shell Oil Company who is the assignee of record.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences, which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF CLAIMS

Claims 1-11 are finally rejected.

STATUS OF AMENDMENTS

No amendment has been filed after the final rejection presented in the Examiner's Final Office Action mailed on June 10, 2008.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed subject matter is directed to a process for the production of a pipeline-transportable crude oil from a bitumen feed. The process comprises dividing in step (1) the bitumen feed into two fractions, with a first fraction comprising between 20 and 80 wt% of the bitumen feed and a second fraction comprising between 80 and 20 wt% of the bitumen feed. *See* Para. [0009], [0017], [0028]-[0029] of the published specification. The two fractions together form 100 wt % of the bitumen feed. *See ibid.* The first fraction obtained in the dividing step (1) is distilled in step (2) into a light fraction boiling below 380 °C and a residual fraction. *See* Para. [0011], [0018], [0029]. At least part of the residual fraction obtained in the distillation step (2) undergoes thermal cracking in step (3). *See* Para. [0011], [0019], [0028] – [0029]. The product obtained in the thermal cracking step (3) is distilled in step (4) into one or more light fractions boiling below 350 °C, optionally, one or more intermediate fractions boiling between 350 and 510 °C, and a heavy fraction boiling above at least 350 °C. *See* Para. [0012], [0020], [0028]-[0029]. The second fraction obtained in dividing step (1), the light fraction obtained in distillation step (2), and the one or more light fractions obtained in distillation step (4) are combined to obtain a pipeline-transportable crude oil, and the heavy fraction obtained in distillation step (4) is used for the generation of power and/or heat. *See* Para. [0012], [0022], [0026], [0028]-[0029].

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-11 are unpatentable under 35 U.S.C. 103(a) over Myrstad et al (WO 98/10036).

ARGUMENT

The Examiner has rejected the pending claims as being obvious over the single publication of Myrstad without citing any additional prior art reference to supply the features of

the Applicants' claimed invention that are missing from the teachings of Myrstad. A number of these missing features are acknowledged by the Examined as not being disclosed by Myrstad.

THE MYRSTAD PUBLICATION (WO 98/10036)

Myrstad discloses a process for improving the transportability of a heavy oil, such as a bitumen, by a process that involves the steps of separating out a part of the heavy oil and degrading it to a more liquid substance by mixing it with solid particles and, optionally, water, upgrading the mixture by cracking it in a hammer mill type apparatus, and thereafter separating the solid particles from the resulting treated oil before mixing the resulting treated oil with the remaining part of the heavy oil. *See*, *e.g.*, Myrstad at page 3, lines 9-19; and page 5, lines 1-13. None of the steps of the Myrstad process include a distillation separation step, and, nor do any of the steps include thermal cracking by use of a furnace cracking process. Myrstad, thus, does not disclose or suggest the application of distillation methods or of thermal cracking by the use of indirect heat, such as by a furnace, and it further fails to disclose or suggest the use of a distilled heavy fraction of oil, processed through a series of processing steps, in power or heat generation, which all of such features are part of Applicants' claimed invention. Moreover, there is no disclosure in the Myrstad publication of the combination of multiple distillate fractions with bitumen oil to improve its transportability, which is also a feature of Applicants' claimed invention.

Concerning the cracking operation of the Myrstad process, it utilizes a hammer mill type apparatus instead of a thermal cracking process such as in Applicants' claimed process that utilizes a furnace or other type of indirect heat transfer equipment for supplying heat energy for inducing the heavy oil cracking reaction. In the Myrstad process, the heavy oil portion that is upgraded to a more liquid oil is "by subjecting the heavy oil to a cracking operation under specific conditions in a hammer mill type of apparatus." *See* page 3, lines 11-16; page 5, lines 5-10, 15-19; and page 6, lines 20-31. The heavy oil portion that is to be upgraded by the hammer mill type apparatus is mixed with solid particles, and, optionally, with water, prior to being fed to the hammer mill. *See* page 3, line 25- page 4, line 5; page 5, lines 5-7, 21-37; page 6, line 17- page 7, line 2; page 7, lines 10-14; and elsewhere. The treated oil from the hammer mill type apparatus is subjected to a solid-liquid separation to separate the upgraded oil from the solid

particles. *See* page 5, lines 10-13; page 7, lines 16-22. The upgraded part of the heavy oil is mixed with the remaining untreated portion of the heavy oil to thereby provide a resulting oil mixture having desired transportation properties. *See* page 3, lines 16-19.

RESPONSE TO REJECTION

Claims 1-2

As already noted above, Myrstad does not disclose the distillation step (2), the thermal cracking step (3), the distillation step (4), the combining step (5) or the step (6) of using for power or heat generation. All of these process steps are recited in Applicants' claimed process. The Examiner explicitly acknowledges in his Office Action that Myrstad does not specifically disclose step (2) of Applicants' process, but he has not cited any secondary art to supply this element of Applicants' process that is missing from the teachings of the Myrstad publication. Also, the Examiner has not cited any secondary art to supply any of the other features that are noted above as missing from the teachings of the Myrstad publication.

Step (2) of the present process requires distillation of the first fraction into a light and residual fraction, while in step (3) only the residual fraction is thermally cracked. Such distillation prior to thermal cracking is not taught or suggested by Myrstad. Instead, Myrstad teaches supplying a bitumen feed, mixed with sand and, optionally, water directly to a hammermill type of reactor without any prior distillation to produce a cracked hydrocarbon product. The cracked hydrocarbon product is then added to the untreated bitumen with significant lowering of both viscosity and pour point. (Myrstad, page 10, lines 24-29).

Step (4) of Applicants' process requires a further distillation step, which is not remotely taught or suggested by Myrstad. In step (4) of Applicants' process, the thermally cracked product obtained in step (3) is distilled into one or more light fractions, optionally into one or more intermediate fractions and a heavy fraction. In marked contrast, in Myrstad the entire cracked hydrocarbon product is added to the untreated heavy oil, without any separation into fractions.

Step (5) of Applicants' process involves combining the light fractions from steps (1) and (4) with the untreated portion of the bitumen feed. This is not suggested by Myrstad, which teaches combining the entire cracked hydrocarbon product with the untreated heavy oil.

Regarding step (6) of Applicants' process, since Myrstad never separates the fuel oil from the rest of the bitumen, either before or after thermal cracking, and since Myrstad adds the entire

cracked hydrocarbon product to the untreated bitumen, Myrstad can not reasonably be said to suggest step (6), wherein the heavy fraction separated in step (4) is used for the generation of power or heat.

The Examiner, apparently recognizing that Myrstad does not disclose step (2) or a number of the other steps in Applicant's process, takes the position that these steps would be obvious because: "It is known to those skilled in the art that fuel oil is the required feed in thermal cracking and middle distillates are value-added products needed in the process. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the Myrstad invention and separate the middle distillate portion (150 to 350°C fraction) in an additional step (2), and take only the heavy oil portion (>350°C) into the thermal cracking reactor." This position is untenable for a number of reasons as discussed below.

Myrstad itself contradicts the statement "that fuel oil is the required feed in thermal cracking". The feed to the thermal cracking process of Mrystad is bitumen, not fuel oil. There is no indication in Myrstad that the fuel oil fraction is ever separated from the bitumen, either before or after thermal cracking. Hence, fuel oil is not "the required feed in thermal cracking". Myrstad clearly teaches bitumen can be used as feed to a thermal cracking process, and further suggests it is not necessary to separate out the fuel oil fraction from the bitumen prior to thermal cracking.

Myrstad also contradicts the statement that middle distillates are value added products "needed in the process." As in the case of fuel oil, the middle distillates in Myrstad are never separated from the bitumen feed before or after thermal cracking. The bitumen feed is thermally cracked without separation of the middle distillates or the fuel oil, and the entire cracked hydrocarbon product is added to the untreated bitumen to significantly lower its pore point and viscosity. Thus, middle distillates are not needed in the process of Myrstad, at least not as a separate fraction. There is simply no motivation provided by Myrstad to divide the bitumen into different fractions by distillation prior to, or after, thermal cracking.

Claims 3-4

Regarding present claims 3 and 4, wherein the thermally cracked product is split by distillation into light, intermediate and heavy fractions, the Examiner notes that Myrstad discloses on page 10 that the hydrotreated product contains 54% middle distillates and 46% fuel oil, which is true. However, in Myrstad the middle distillates and fuel oil are never separated into

fractions from the cracked hydrocarbon product. Thus, Myrstad does not teach taking a middle distillate cut or a fuel oil cut, and certainly does not teach taking an intermediate fraction cut. Instead, Myrstad teaches mixing the entire uncut cracked hydrocarbon product with the untreated bitumen.

The fact that Myrstad knew that middle distillates and fuel oil boiling range components were present in the cracked hydrocarbon product, but chose not to separate these fractions, and instead mixed the entire cracked hydrocarbon product with the untreated bitumen, supports the unobviousness of claims 3 and 4. Clearly, Myrstad (who is one skilled in the art) did not believe it was necessary or desirable to separate middle distillates or fuel oil fractions from the thermally cracked product prior to mixing it with the untreated bitumen.

The benefits of distilling the bitumen into different fractions prior to thermal cracking, and the benefits of further distilling the thermally cracked product into light, intermediate and heavy fractions after thermal cracking, is only taught in Applicant's application, which teachings, of course, cannot be used as a basis for the rejection.

Claim 5

Regarding present claim 5 wherein the intermediate fraction is thermally cracked followed by distillation into a light product and a heavy product, clearly these limitations are not remotely taught or suggested by Myrstad. The intermediate fraction recited in claim 5 is distilled from the product of thermally cracking the residual fraction obtained in step (2). Since Myrstad does not disclose step (2), step (3) or step (4) which produce the intermediate fraction(s), it cannot be obvious from the Myrstad to thermally crack the intermediate fraction and to subsequently distill it into a light product and heavy product.

In the Examiner's Office action it is stated that it would have been obvious to increase the production of lighter fractions to be used in step (5) "[s]since the lighter components are more desired for blending in step (5)." The basis for this statement is unclear. Certainly it is not based on Myrstad, because Myrstad never separates the lighter components from the cracked hydrocarbon product. As discussed above, the entire uncut cracked hydrocarbon product is added to the untreated bitumen in Myrstad.

Claims 6-8

Regarding present claims 6-8, these claims are indirectly dependent on claim 1, and, thus, contain the same limitations as claim 1 to the six step process. Therefore, claims 6-8 are believed patentable over Myrstad for the reasons given above in connection with claim 1.

Claims 9-11

New claims 9-11 are also directly or indirectly dependent on claim 1, and are believed patentable for the same reasons as discussed above in connection with claim 1.

RESPONSE TO EXAMINER RESPONSE

The Examiner has attempted to respond to the arguments presented above by making many unsubstantiated assumptions concerning what the Examiner, and not a skilled artisan, considers to be obvious to persons skilled in the art, but no secondary reference has been cited that supports or affirms the Examiner's conclusions as to what he considers those skilled in the art would believe. As demonstrated in the above comments, the Myrstad publication clearly does not disclose or teach step (2), step (3), step (4), step (5) or step (6) of Applicants' claimed process, and the Examiner has not cited any secondary prior art to support his assertion that such process steps in the claimed arrangement would be obvious to on skilled in the art.

CONCLUSION

In view of the many differences between the Applicants' claimed subject matter and the cited prior art and the omissions by the prior art of the many claim limitations and elements as noted above, it is submitted that claims 1-10 are patentable. The Applicants, therefore, respectfully request the Board to reverse the Examiner's final rejection in this application.

Respectfully submitted,

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CLAIMS APPENDIX

1. A process for the production of a pipeline-transportable crude oil from a bitumen feed, the process comprising:

(1) dividing the bitumen feed into two fractions, the first fraction comprising between 20 and 80 wt% of the feed, the second fraction comprising between 80 and 20 wt% of the total feed, the two fractions together forming 100 wt % of the feed;

(2) distilling of the first fraction obtained in step (1) into a light fraction boiling below 380 °C and a residual fraction;

(3) thermal cracking of at least part of the residual fraction obtained in the distillation process described in step (2);

(4) distilling of the product obtained in step (3) into one or more light fraction(s) boiling below 350 °C, optionally one or more intermediate fractions boiling between 350 and 510 °C and a heavy fraction boiling above at least 350 °C;

(5) combining the second fraction obtained in step (1), the light fraction obtained in step (2) and the light fraction(s) obtained in step (4) to obtain a pipeline-transportable crude oil; and,

(6) using the heavy fraction obtained in step (4) for the generation of power and/or heat.

2. The process according to claim 1, in which the bitumen feed in step (1) is divided into two fractions, the first fraction comprising between 40 and 60 wt% of the feed and the second fraction comprising between 60 and 40 wt% of the total feed.

3. The process according to claim 2, in which the thermally cracked product is split by distillation into a light fraction (boiling below 350 °C), an intermediate fraction boiling between 350 and 510 °C and a heavy fraction boiling above 510 °C.

4. The process according to claim 3, in which at least part of the intermediate fraction is also added to the pipeline-transportable crude oil of step (5).

5. The process according to claim 4, in which the intermediate fraction is thermally cracked, followed by distillation into a light product and a heavy product, the light product being added to the pipeline-transportable crude oil mentioned in step (5), and the heavy product being used in the generation of power and/or heat as described in step (6).

6. The process according to claim 1, in which the thermal cracking in step (3) is carried out at a temperature between 440 and 510 °C and a pressure between 5 and 50 bara.

7. The process according to claim 1, in which the thermal cracking in step (3) is carried out in a soaker vessel.

8. The process according to claim 7, in which the thermal cracking is carried out at a temperature between 420 and 500 °C and a pressure between 2 and 20 bara.

9. The process according to claim 1 in which the first fraction obtained in step (1) is distilled unto a light fraction boiling below 450 °C and a residual fraction.

10. The process according to claim 2 in which the first fraction obtained in step (1) is distilled unto a light fraction boiling below 510 °C and a residual fraction.

11. The process according to claim 3 in which all of the intermediate fraction is added to the pipeline-transportable crude oil of step (5).

Evidence Appendix

None

Related Proceedings Appendix

None